DOCUMENT RESUME

ED 285 889 TM 870 465

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TITLE Evaluation Services from Needs Assessment to Follow-up: A Case Study.
INSTITUTION Anderson (Arthur) and Co., St. Charles, IL.
PUB DATE Oct 86
NOTE 15p.; Paper presented at the Annual Meeting of the American Evaluation Association (Kansas City, MO, October 29-November 1, 1986).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adults; Case Studies; Computer Assisted Testing; Computer Managed Instruction; Formative Evaluation; Independent Study; Job Analysis; *Job Training; *Needs Assessment; Postsecondary Education; *Professional Training; Program Development; *Program Evaluation; Summative Evaluation; Test Construction; *Training Objectives
IDENTIFIERS *Arthur Andersen and Company

ABSTRACT

This paper describes the nature and scope of evaluation services provided within the training division of Arthur Andersen & Company, and highlights some of the evaluation results. The cycle of assessment began with a needs assessment study at the curriculum level. Curriculum planning was undertaken for first-year trainees in the Tax Division. A task force identified needed skills, which were validated in a survey of 360 people. An instructional design team developed topic descriptions, grouped them into workable course units, and supervised curriculum development of self-study courses with computer-managed instruction and testing. Pretests and posttests were constructed from an item pool which was revised on the basis of test item data from 750 participants; mastery levels were designated. Both the self-study course and the instructor-led school were evaluated, prior to releasing the courses to the field, by interviews, questionnaires, instructor feedback, and observation. A schedule of maintenance evaluation was put in place. A follow-up evaluation surveyed 180 seniors and 180 professional staff in 28 geographically representative U.S. offices, and five on-site interviews were conducted. In general, the new curriculum was successful in meeting skill needs identified by the curriculum study. (Author/LPG)

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A CASE STUDY: EVALUATION SERVICES FROM NEEDS ASSESSMENT TO FOLLOW-UP

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A paper presented at the annual meeting of the American Evaluation Association, Kansas City, Missouri, October 1986.

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TM 870 465

A Case Study: Evaluation Services from Needs Assessment to Follow-up

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Abstract

The purpose of this paper is to discuss the nature and scope of evaluation services provided to a specific program area within the training division of Arthur Andersen & Company as well as highlight some of the evaluation results. The cycle of evaluation began with a needs assessment study at the curriculum level, evaluation of several training courses developed as a results of the needs assessment and curriculum planning effort, planning for on-going maintenance of several training courses, and conducting a follow-up study to assess the impact of the training on job performance.

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Curriculum Needs Assessment

A needs assessment was done as part of the curriculum planning effort for the Tax Division. The goals of the curriculum planning effort were:

1. To identify the technical and nontechnical training requirements for each of six professional levels from new staff through experienced manager.

2. To identify appropriate prerequisite training structures to insure that persons receive training at the appropriate points in their career.

3. To identify training that best supports the business objectives of the Tax Division.

4. To create a training curriculum that can be effectively and efficiently delivered and maintained.

The general approach to the development of a new curriculum plan was to identify training requirements without reference to existing schools/courses, to determine training needs by identifying those training requirements not presently being met, and to specify a curricular structure and delivery system which would fulfill the requirements and satisfy the needs.

To support the general approach outlined in the previous paragraph, a six-stage curriculum planning model was developed. Each stage of the model is described below.

Stage I: Task Force Review. A Task Force of 49 professionals was created. People were selected for the Task Force according to region, office size, and professional level. The purpose of the Task Force was to identify basic skills required at each of six professional levels for competent performance. Data collection techniques used with the Task Force included nominal group technique sessions and a Delphi study. The nominal group technique is a structured brainstorming technique which forces participants to arrive at consensus. A meeting of the Task Force, using the nominal group format, was conducted to produce an initial set of skills for the six professional levels being considered. The Task Force was divided according to their level and asked to consider skills needed for the level below them without consideration of existing training. They identified over 100 skills for each of the six levels. They grouped the skills into categories and ranked the categories according to their importance.

In continuing with Stage I of the Curriculum Planning effort, a list of skills was used to develop a Delphi survey. The purpose of the Delphi survey was to expand the list of skills for each of the six levels and to gain consensus on which skills were the most important ones. A series of three Delphi surveys were administered to the Task Force members. Each Delphi survey built off the previous one, including results and commments. Thus, respondents could reassess their opinions in light of the opinions of others.

Stage II: Validation. A validation stage was designed to provide feedback on the acuracy of the Task Force findings and to identify competency needs across offices. A survey was sent to a sample of 360 people (none of whom were on the Task Force) to determine whether (a) the skills identified by the Task Force were representative of requirements in their offices and (b) to determine to what degree personnel in each office possessed each skill when they started at a given professional level. For each skill on the validation survey, respondents were asked to provide information about how often they performed the skill, how much time they spent in performing it, and whether they had a need for training in the skill.

Stage III: Analysis. This stage involved a review and analysis of the data collected to determine training needs. Task Force data, data received via the validation survey, and business plan data that related directly to training was reviewed. At this time, existing training materials were also examined.

Stage IV: Topic Descriptions. The work in this stage was completed by personnel with expertise in instructional design. The purpose of this stage was to develop topic descriptions covering the intended audience/level, content areas to be covered, and instructional strategies to be used.

Stage V: Logistics and Course Descriptions. The work in this stage was also completed by personnel with expertise in instructional design. The purpose of this stage was to identify the delivery system for the training and to group related topics together into courses.

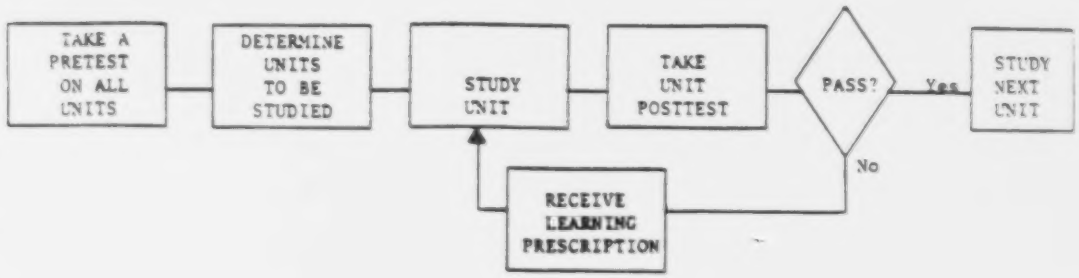
Stage VI: Curriculum Development. Stage VI involved the actual development of the Curriculum Plan. The Curriculum Plan included a development schedule, resource requirements, evaluation plans, and maintenance plans. The evaluation plan was a high level outline of how the effectiveness of the curriculum would be evaluated. The maintenance plan outlined procedures for updating and enhancing the curriculum over time.

Some of the preliminary findings of the curriculum planning study were that the present training was too concept-oriented and that more specialized, advanced training was done too early, i.e., before personnel needed it on the job. Conclusions based on the findings were that the new curriculum must: be how-to oriented, targeted to the audience that needs it, include nontechnical training, include computer application training, be modularized, allow for testing out. Self-study courses were to be developed that focused on concepts and instructor-led schools were to be developed that would allow opportunity for application of the concepts.

As the Tax Division began to develop the new courses and schools in the first-year (i.e., new staff) curriculum, they requested/planned for evaluation assistance in several areas. Evaluation assistance was requested in the areas of: test development, course development, routine maintenance of courses, and a follow-up (i.e., impact study) of the new staff curriculum. The remainder of this paper focuses on the evaluation services provided to the Tax Division in the development and conduct of training courses in the first year of the new curriculum.

Test Development

Each self-study course in the new curriculum is supported by a computer-managed instruction component. Proficiency tests were used in the self-study courses to determine whether certain skills and content had been mastered. There were both pretests and posttests. Participants were exempted from those units for which could demonstrate proficiency based on pretest results. A posttest was administered at the end of each unit of study to assess whether the participants had mastered the content of that unit. If the posttest results showed mastery, the participant would proceed to the next unit of study. If the results of the posttest showed that the participant had not mastered a unit, a learning prescription would be generated directing the participant to topics that had not been mastered. The figure below illustrates the testing sequence.



The methodology used for the test development process consisted of the following steps:

1. Construction of Test Blueprint
2. Development of Test Item Pool
3. Initial Revisions of Test Item Pool
4. Test Analysis
5. Final Revisions of Test Blueprint and Item Pool

Each of these steps is described below in reference to the test development and analysis of the first self-study course that was developed.

Step 1: Construction of Test Blueprint. A test blueprint was developed for the pretest and all the unit posttests. The number of items developed for each unit was based on the following factors: (a) the relative importance of each topic/unit; (b) the relative importance of each terminal instructional objective; (c) the total instructional time estimated for each topic/unit; and (d) the total time spent by a participant on any single test could not exceed 20-30 minutes. Both the pretest and unit posttests were structured in such a way that the item pool for each test was larger than the number of items any participant would receive. The CMI system was used to randomly select a specified number of items from the pool. The test blueprint specified the total number of items to be developed for each unit and within that a breakdown of the number of items necessary for each topic and for each terminal objective within each topic. The blueprint also specified the number of items to be selected from the item pool.

Step 2: Development of Test Item Pool. Each test item in the item pool was tied directly to a single instructional objective. The item writers had available to them the written instructional objectives as well as the related instructional materials and other reference texts. All items underwent two types of reviews: a content review and a technical review. The content review focused on such things as the relevance and importance of the item, an assessment of the plausibility of the incorrect options, and an assessment that there was one best or clearly correct answer. A technical review was done by personnel in a group specializing in evaluation services to ensure that the items adhered to appropriate technical test construction principles.

Step 3: Initial Revisions of Test Item Pool. When an initial test was made of the instructional materials (this is described in the next section of the paper), the CMI component was also tested out. Detailed item analysis information was not obtained at this time because of the small number of participants; however, participants provided feedback on items they perceived to be ambiguous or incorrect in some way. Revisions of the instructional materials after this tryout also necessitated some changes in test items. Prior to release of the course to the field, all test items underwent an additional content review and further item revisions were made. Mastery levels to demonstrate proficiency were determined prior to the tryout, and revised before the course was released to the field.

Step 4: Test Analysis. Test item data was collected on a sample of about 750 participants taking the self-study course over a six month period. Four characteristics of the CMI system were examined: (a) item difficulty and instructional sensitivity, (b) item discrimination, (c) randomness of item selection, and (d) equality of test difficulty.

Step 5: Final Revisions of Test Blueprint and Item Pool. Two types of test item data were used in making revisions: item difficulties and point biserial correlations. These data were used to flag items for review. For objectives that were easy on the pretest or that were difficult on the posttest, all items were flagged to indicate they and the related instructional content should be reviewed. In addition, items which were easy on the pretest or difficult on the posttest and negatively discriminating items were flagged for review. Flagged items were reviewed by the evaluators and suggestions made for possible revisions. Instructional designers and content experts reviewed all the flagged items as well as the suggestions and made final revisions to the items.

Course Development Evaluation

The next area of evaluation that the Tax Division requested assistance in was course development evaluation, i.e., evaluation of the effectiveness of the instructional materials and methods used prior to releasing the course to the field. The information in this section of the paper relates to the first self-study course and the instructor-led school which followed it.

Evaluation Questions/Issues. General evaluation questions that were addressed at this time included:

1. Is it likely to be well-received?
2. Is it likely to accomplish its goals?
3. What modifications would enhance the likelihood of success?

Among the specific evaluation issues that were addressed were the following: time spent completing the self-study units, the link between the self-study course and the instructor-led school, and how well the computer-managed instruction component functioned.

Data Collection Procedures. Data collection procedures that were chosen for the evaluation of the self-study course included: interviews with participants, questionnaires to be completed by participants, "red pen" comments in the instructional materials, time logs to be completed by participants so that an estimate of how long it took to work through the course could be obtained, and topic comment sheets to be completed by participants (i.e., to give participants the opportunity to provide an overall assessment of the effectiveness of specific topics as well as to write comments about specific topics). Data collection procedures that were chosen for the evaluation of the instructor-led school included: interviews with participants and instructors, questionnaires to be completed by participants and instructors, "red pen" comments in the instructor and participant materials, and observation by an evaluator of the conduct of the training.

Evaluation Results. Strengths of the self-study course included the following: the modular, self-study format; relevance of the content to participants' current job responsibilities; practice activities. Strengths of the instructor-led school included the following: the instructors, the application approach, the emphasis on the Tax Code and Regulations, the inclusion of an interpersonal skills unit. Key findings/suggestions for the self-study course included the following:

1. Examine ways to help ensure that offices provide environments conducive to test-taking.

2. Consider providing more practice activities prior to the unit posttests.

3. Review some of the units to ensure that enough supporting examples are provided.

Key findings/suggestions for the instructor-led school included the following:

1. Review the time allotments relative to the amount of content and the complexity of activities in the topics/school.

2. Consider having the instructor provide more guidance to the participants prior to the activities.

3. Consider ways to increase the effectiveness of the participant guide as an in-class learning aid and as a post-class reference tool.

Maintenance Evaluation

After each new course in the curriculum underwent a course development evaluation, the evaluator worked with the instructional designer to plan the type of information that would be collected in an on-going maintenance of the training. Generally, participants were asked to complete questionnaires at the end of each major unit of study. In addition, for the self-study courses, a sample of participants were asked to complete time logs. Instructors also provided on-going feedback. One other source of maintenance evaluation information was that of test results.

Follow-up Evaluation

A follow-up study of the impact of the new first-year curriculum on first-year staff's job performance was planned and carried out one year after the new curriculum was put into place. The follow-up study was designed to answer three primary questions:

1. What is the effect of the new staff curriculum on the first-year staff's performance of job responsibilities?
2. What is the perception of tax professionals toward the new staff curriculum?
3. How has the new staff curriculum affected training administration in the office's Tax Divisions?

To answer the above questions, a five-stage approach was used. This approach is outlined below.

Stage I: Project Definition and Planning. The evaluators worked with personnel in the Tax Division in identifying critical skills/objectives within the curriculum and in selecting the study sample.

Stage II: Detailed Design. The evaluators drafted and pilot-tested two surveys--one for first-year staff and one for second-year seniors. The purpose of the surveys was to gather information about how the new curriculum was affecting the job performance and attitudes of tax professionals.

Stage III: Data Collection - Surveys. The evaluators distributed surveys to 180 seniors and 180 staff in 28 geographically representative U.S. offices. Five of these offices were slected for site visit interviews.

Stage IV: Data Collection - Interviews. Interviews were conducted by two-person teams, one person from the evaluation group and one person from the Tax Division. The purpose of the interviews was to validate and expand upon the survey results, and to seek any unidentified training or training-related needs that are not currently being addressed by the

curriculum. At each office, individual interviews were conducted with the head of the Tax Division, the tax staffing coordinator, the tax training coordinator, the Career Development Program coordinator, partners, and managers. Small group interviews were conducted with seniors and staff.

Stage V: Final Reporting. The evaluators compiled and analyzed the survey and interview results for a presentation to a Curriculum Advisory Panel and also documented the results in a written report.

Findings. Survey and interview findings indicated that the training in the first-year staff curriculum is meeting the skill needs identified by the curriculum study. While some skills were being better addressed than others, findings indicated no substantial areas of weakness. Additionally, the new curriculum was seen as more relevant that the former curriculum. The training supported the skills first-year staff are required to perform on the job. While the curriculum was viewed as an improvement over the former curriculum, some issues emerged based on the survey and interview findings that should be reviewed and monitored. The four issues identified were: testing, flexibility, increased management awareness, and catch-up training. Each of these issues is discussed in the following paragraph.

Issues. While people see many positive aspects to the testing component, some concerns were expressed: some test items seemed ambiguous and too detailed; staff indicated they would like to receive specific feedback on why their answers to items were wrong; some people though there was not sufficient time estimated to complete the materials and all the tests; in some offices staff said there were so few computers for testing/training that they sometimes could not get access to a terminal. There were some comments

regarding the flexibility of the scheduling: the instructor-led school should be scheduled so as not to conflict with the CPA exams in November and May; conducts should be scheduled so as not to conflict with major deadlines for tax returnsn; the instructor-led school should be scheduled for mid-year hires in late January or early February so they can complete it prior to the "busy season." Partners and managers said they want to know more about what is being planned for the tax training programs. It was suggested that this could be done via presentations at a Tax partner/manager meeting and or via presentations given in the offices by the Tax Training Coordinators. There may be a need for some catch-up training in certain areas of the new curriculum since now new staff are being training in skills that those supervising them do not currently have, e.g., particularly the microcomputer and software application skills, and the standardized approaches to tax return preparation, workpaper documentation, and tax file organization.

Summary

Evaluation services continue to be provided to the Tax Division on a routine basis. As the curriculum for each year of tax training is developed, evaluators work with the instructional designers to plan for the test development, course development, and maintenance evaluations. A follow-up of the curriculum for the second-year staff has also been completed and there are plans to conduct follow-up studies for each subsequent year of training.